A-99-03
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MEMORANDUM

DATE: September 26, 1997

SUBJECT: Deletion Petitions: Preliminary completeness review for MEK petition submittal.

FROM: Lisa Sutton, EC/R Incorporated LS
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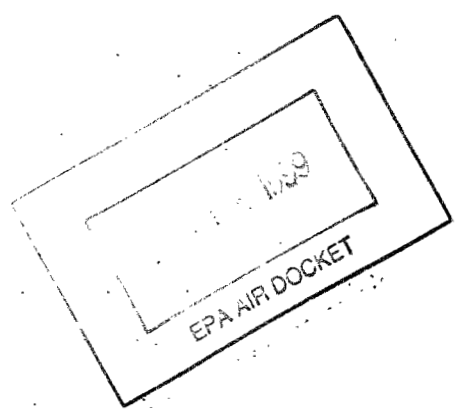
TO: Kelly Rimer, EPA/OAQPS/AQSSD/REAG

Attached is a preliminary report of EC/R's completeness review for the petition submitted by AF&PA to delist methyl ethyl ketone (MEK). This report, prepared as planned under our Work Plan's Task 3, is organized to closely correspond to the completeness checklist included in Sally Shaver's September 1996 draft guidance memorandum on the delisting process.

At the suggestion of Bob Hetes, in this report EC/R has attempted to expand its description of the petitioner's strategy and of the data that are provided, to provide more than an identification of areas that may lack supporting data.

cc: Deborah Amaral, EC/R Incorporated

Attachment



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COMPLETENESS REVIEW OF METHYL ETHYL KETONE (MEK) DELETION PETITION

EPA Contract No. 68-D6-0065
Work Assignment No. 0-7
EC/R Project No. HRA-007

PRELIMINARY REPORT

Prepared for:

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September 26, 1997

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EXECUTIVE SUMMARY

In November 1996, the U.S. Environmental Protection Agency (EPA) received a petition to delete methyl ethyl ketone (MEK) from the list of hazardous air pollutants (HAPs) contained in section 112(b)(1) of the Clean Air Act Amendments of 1990. The petition was submitted on behalf of the Chemical Manufacturers Association (CMA) Ketones Panel.

Under contract to the EPA, EC/R Incorporated performed a preliminary review of the completeness of the MEK petition. It should be noted that the completeness review does not constitute a technical review; that is, a notation in the report on the location of information should not be construed to be a verification of the information's validity from a technical standpoint.

For reporting purposes, review comments are organized into six general areas: (1) general information; (2) rationale, methodology, and supporting evidence; (3) source and emissions information; (4) transport, fate, modeling, and exposure information; (5) risk, health and environmental effects information; and (6) additional information. Completeness of the petition with respect to the first five areas is summarized below.

General information. Information of a general nature (e.g., contact person for petition, HAP synonyms, chemical structure of HAP) appears complete.

Rationale, methodology, and supporting evidence. Summary completeness considered only the petition's executive summary. The summary addresses the rationale for desired action and the identification of the number of sources (but not the source categories or sources themselves). The methodology summary describes emissions estimation from Toxic Release Inventory (TRI) and ambient monitoring data. It also describes dispersion modeling and ambient monitoring but does not address environmental fate modeling and meteorology, terrain, population, or exposure analyses. No explicit summary of hazard identification and dose response methods were found, but data on human health and environmental effects were summarized. No risk assessment results were summarized.

Source and emissions information. Source information was taken from the 1994 TRI, but no complete list of TRI MEK sources is included. The top 27 TRI emitters are listed with city and state, but no address or lat/long information is provided for any source. Industrial operations are described in terms of MEK production and use, as well as SIC codes for TRI facilities. Emissions parameters are provided for modeled sources where data was taken from public record; other source parameters were said to be confidential. Similarly, emissions estimates were reported for modeled sources where data was taken from public record or TRI; other emissions estimates were said to be confidential. No emissions estimates or calculations were included for sources that were not included in the modeling analysis. Time resolution of

emissions estimates were generally annual. Information on the general class of sources was addressed in terms of SIC codes from TRI and ambient monitoring data but did not consider consumer products, etc.

Transport, fate, modeling, and exposure information. Detailed description of the model and version, features, and time resolutions were provided; however, distributions of short-term and annual average ambient concentrations and deposition/concentration in other media were not included. Environmental fate, transformation, and transport factors such as solubility, vapor pressure, octanol/water partition coefficient, adsorption coefficient, and persistence and bioaccumulation potential were included, while others such as atmospheric residence time, phase distribution, transformation products, and particle size distributions were not. Meteorological information and receptor site location were included. Exposure modeling considered only inhalation through comparison to RfC; however, no RfC hazard indices were calculated, and no human or ecosystem exposure/loadings were analyzed.

Risk, health, and environmental effects information. Human health risk estimation methodology did not directly consider hazard identification or dose response methodology, but the information could be concluded from the data on health and environmental effects. Cancer risk was not addressed, as the petition states MEK is not carcinogenic. Non-cancer risks are considered by comparison of emissions modeling air concentrations to the RfC, but no hazard indices or distribution of the estimates are provided. Environmental/ecosystem risk methodology is not directly considered, but some environmental persistence, bioaccumulation, and aquatic toxicity studies are addressed. Health and environmental effects are supported by human evidence studies of various types, including acute epidemiology, acute clinical, and carcinogenic case-control. Animal evidence includes acute, subchronic, chronic, reproductive, developmental, neurotoxicity, and carcinogenicity studies. Environmental toxicity evidence includes environmental monitoring of air and water concentrations, and the persistence, bioaccumulation, and aquatic toxicity studies described above, but it does not address any wildlife field studies, monitoring, or indicators. Other effects evidence includes *in vitro* genotoxicity tests, a recalculation of RfC, and a section on "other effects." Toxicokinetic, toxicodynamic, comparative metabolic, and structure activity studies were not found.

I. GENERAL INFORMATION

1. Name of petitioner(s)

Chemical Manufacturers Association Ketones Panel
Cover letter.

2. Address of petitioner(s)

Address, cover page of petition.

3. Contact person(s) for petition

Barbara O. Francis, cover letter.

4. Telephone(s) and address(es) of contact(s)

Telephone, cover letter.
Address, assume to be the same as CMA, cover page of petition.

5. Description of the organization(s) submitting the petition

Not found.

6. Statement of action(s) requested

Statement of action (removal of MEK from the list of chemicals that are regulated as HAPs), petition, page 1.

7. Identification of substance(s). Including:

A. Common name(s)

Methyl Ethyl Ketone (MEK), petition, page 1.

B. Common synonym(s)

2-Butanone and methyl acetone, petition, page 3.

C. Chemical Abstract Service (CAS) number

CAS No., petition, page 3.

D. Chemical formula(s)

Chemical formula, Appendix B (not found in petition).

E. Chemical structure(s)

Chemical structure, Appendix B (not found in petition).

II. SUMMARY OF RATIONALE, METHODOLOGY, AND SUPPORTING EVIDENCE

Considered only the executive summary in this section (petition, pages i through iv); the petition and appendices are considered in the detail sections (III through V).

1. Summary of rationale for desired action

Summary of statutory delisting criteria, and statement of belief that MEK meets the criteria, petition, page i.

2. Summary of identified industries/source categories/sources

Summary states that there are over 2000 TRI facilities, but no summary of specific sources, source categories, or industries provided, petition, page ii.

3. Summary of methodological approach. Including:

A. Summary of emission estimation techniques

TRI and ambient monitoring data, petition, page ii.

B. Summary of exposure modeling methods, including dispersion and environmental fate modeling, meteorology, consideration of terrain, any monitoring, analyses of population, any analyses of exposure distributions such as Monte Carlo simulation

Summary of dispersion modeling and ambient monitoring, petition, page ii.

Summary of environmental fate modeling, meteorology, consideration of terrain, analyses of population, and exposure distribution analyses not found in summary.

C. Summary of hazard identification and dose response methods

No summary of hazard identification and dose response, *per se*, but summary of data on health and environmental effects, petition, pages i and ii.

4. Summary of risk assessment results

No summary found.

III. DETAILED SOURCE AND EMISSIONS INFORMATION

1. Detailed source information

1994 TRI data, reported by range in lb/y, petition, page 31 (no complete list of TRI facilities). Three MEK production facilities, petition, page 32.

Appendix I, page 2-2 lists the top 27 MEK emitters based on TRI data.

Natural sources of MEK, petition, pages 4 and 5.

A. Source location information (lat/long, address)

No complete list of TRI sources. Top 27 TRI MEK emitters with city and state, Appendix I, page 2-2.

No lat/long or address information found.

B. Industrial operation(s) description

Production and use, petition, page 3.

Two-digit SIC codes for top 27 TRI MEK emitters, Appendix I, page 2-2.

Two-digit SIC codes for lesser TRI MEK emitters, Appendix I, page 5-3 (does not include a list of TRI sources in each SIC code).

C. Source emissions parameters (stack heights, exit velocity...)

Source emissions parameters provided for the 5 sources (of 26 largest modeled sources) that were obtained from public record, Appendix I, page 2-5.

Source emissions parameters estimated for the 6 sources (of 26 largest modeled sources) for which generalized modeling was conducted, Appendix I, pages 5-1 and 5-2.

Source emissions parameters for other 15 largest modeled facilities considered confidential and not provided, Appendix I, page 2-7.

Source emissions parameters estimated for generalized modeling of smaller sources, Appendix I, page 5-2.

D. Source emission estimation calculations

Emissions estimates for 5 sources (of the 26 largest modeled sources) that were obtained from public record, Appendix I, page 2-5.

Emissions estimates for 6 sources (of the 25 largest modeled sources) for which generalized modeling was conducted estimated from TRI, Appendix I, page 2-6.

Emissions estimates for remaining 15 largest modeled sources are considered confidential and are not provided, Appendix I, page 2-7.

Emissions estimates for smaller sources were TRI data for two largest emitters in each of the SIC codes used in the generalized modeling, Appendix I, page 5-1.

No calculation information for the above stated values provided.

E. Time resolution of emission estimates (hourly, annual average)

Large sources: daily emissions rates used in "few instances;" otherwise, daily emissions rates were applied to annual emissions by dividing by 260 days, Appendix I, page 2-7.

Lesser sources: Annual TRI data was used, Appendix I, page 5-1.

2. Information on general class of sources (consumer products...)

Ambient monitoring data considered, petition pages 32 through 34.

Found no comment on consumer sources, etc.

3. SIC and SCC codes for industrial activities that emit chemical of concern

Two-digit SIC codes for top 27 TRI MEK emitters, Appendix I, page 2-2.

Two-digit SIC codes for lesser TRI MEK emitters, Appendix I, page 5-3 (does not include a list of TRI sources in each SIC code).

No consideration for SIC other than TRI.

IV. DETAILED TRANSPORT, FATE, MODELING, AND EXPOSURE INFORMATION

1. Detailed modeling information

A. Name of model and version employed

Large sources:

Tier 1: Look-up tables, petition, page 37, and Appendix I, page 3-1.
Tier 2: SCREEN3, Appendix I, page 3-2.
Tier 3: ISCST3, Appendix I, page 3-5.

Lesser sources: Proposed 112(g) rulemaking modeling approach - HEM - results of sensitivity analysis, Appendix I, pages 5-1 and 5-2.

B. Features/mode used (multimedia, complex terrain, downwash)

Large sources:

Tier 2: Urban/rural based on topo. maps, Appendix I, page 3-2; building downwash employed for buildings within a distance of 5L (where L is the lesser of building height or width) and flat terrain, Appendix I, page 3-4.

Tier 3: "Performed in accordance with the EPA tiered approach and

Guidelines on Air Quality Models," Appendix I, page 3-5. Description states that ISCST3 uses aerodynamic building downwash and area sources; it does not say they were employed in this assessment. Terrain was not used, Appendix I, page 3-5.

Lesser sources: Assumes worst-case-aerodynamic building downwash, Appendix I, page 5-2.

C. Time resolution of model runs (hourly, annual average)

Large sources:

Tier 2: Hourly, Appendix I, page 3-4.
Tier 3: Annual and daily, Appendix I, page 3-5.

Lesser emitters: Annual, Appendix I, page 5-3.

1. Distribution of short-term ambient concentrations

Large sources: No real distribution; summary of estimates for 26 modeled facilities Appendix I, pages 4-1, 4-4, 4-5, 4-6, 4-8.

2. Distribution of annual average ambient concentrations

Large sources: No real distribution; summary of estimates for 26 largest modeled facilities, Appendix I, pages 4-1, 4-2, 4-3, 4-6, 4-7.

Lesser emitters: No real distribution; summary of estimates for 24 modeled facilities, page 5-3.

3. Deposition rates and concentrations in other media (water, soil)

Not found.

D. Environmental fate, transformation, and transport

1. Atmospheric residence time

Not found.

2. Solubility

Water solubility, petition, page 3.

3. Phase distribution

Not found.

4. Vapor pressure

Vapor pressure, petition, page 3.

5. Octanol/water partition coefficient

Log octanol/water partition coefficient, petition, page 3.

6. Adsorption coefficient

K_{OC}, petition, page 28.

7. Media-specific transformation products (including metabolic products)

Not found.

8. Particle size distributions

Not found.

9. Media-specific persistence and bioaccumulation potential

Persistence and bioaccumulation, petition, pages 26 through 28.

E. Meteorological information used

Large sources modeling, Tier 3: Five years of meteorological data from National Weather Service. Surface and mixing height data were chosen based on proximity and geographical setting, Appendix I, page 3-5.

Small sources modeling used generalized location of facility as compared to the HEM climatological sensitivity results, Appendix I, page 5-2.